The Conjunction of Spatial Navigation and Information Systems through Virtual Reality

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The present is constantly being wrapped into vast indoor areas enveloped by modern structures of breath-taking shapes. Cities are being built on top of pillars made of skyscrapers and formula 1 race tracks built on ships. Along with this fast paced evolution the need for indoor navigation grows rapidly. There are many projects that deal with it, e.g. MapFish[[3]](#endnote-1), PointInside[[4]](#endnote-2), Micello[[5]](#endnote-3) or Geopard[[6]](#endnote-4). As building complexes constantly grow to resemble smaller towns both in size and population, organizations that reside in these buildings offer different information through varying information systems to their visitors.

Our project apart from offering a single unified view on all the information that the many different systems process, presents every single bit of information in its intuitive position – its position in the virtual model of the building (its exact copy) corresponds to its real position. Of course the user has quick access to information through the navigation interface or the search option. No matter what device connects to the system – the system uses the device’s potential. Apart from processing gathered information from 3rd party systems, our solution includes complex navigation that helps users to reach their goals, which do not have to be only of spatial character. Each person, lecture or seminar can be found in different rooms depending on the time. Therefore it is essential for the user to be able to acquire this information in a quick and simple manner. Our solution also incorporates a realistic and comfortable tour of the given building from the cosines of the user’s home.

Our project – an interactive virtual model of the new FIIT building – is connected to the Academic Information System (AIS) and will also enable users to access the catering system. Implementation of further information systems is straightforward and simple. Timetables, room information and lecturer availability will be displayed for each room when the user enters it, or simply selects it. The users will be able to search for rooms, people, lectures or seminars that will be displayed in the model based on the given time and date.

The most complex component of the application itself is the three dimensional virtual model of the new FIIT building and is aimed at today’s computers. The application runs under the new WebGL technology that replaced O3D. At the end of the year 2011 almost all of the mainly used browsers should support WebGL by default (with the exception of MS Internet Explorer) and therefore it will not be necessary to install any additional 3rd party applications or plugins. However, the use of these technologies to display 3D models in browsers, limits the use of our application to only a few supported browsers and computers with enough computing power. That is why we have designed a simplified 2D version that can be run under any browser, almost independent on computer hardware. The 2D version user interface will be based on a common approach, as seen in Google Maps[[7]](#endnote-5). The third and simplest version is the client for mobile devices. To own a mobile device is becoming a standard, so users can use the Wi-Fi network access in the building to browse the application and find their way around. The server component ensures the acquisition of up-to-date information from connected information systems as well as the calculation of the optimal path for navigation.

The project is based on last year’s project of the team LOST[[8]](#endnote-6). We enhanced their project with a new technology and different clients. The architecture of our system allows future integration with other information systems. We designed a 2D version and a mobile version of the given application. However due to time constraints, the successor of the team LOST and our team SW7D[[9]](#endnote-7) will be responsible for their implementation.

The interactive virtual FIIT application lets the user roam the fully modelled new building in three different modes: tour, first person view and free flight. Basic and most important information from the AIS is available as well as navigation and a quick search feature.

We believe that this project will affect the way people regard information and navigation systems and that it will support the creation of new universal systems that process information from information systems from many different areas. The goal of our project is to create a system that will be used in the real world and will evolve with time, even after our role on the project will end.

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Image 1 The FIIT building visualization in the free-flight mode

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3. http://mapfish.org/ [↑](#endnote-ref-1)
4. http://pointinside.com/ [↑](#endnote-ref-2)
5. http://www.micello.com/ [↑](#endnote-ref-3)
6. http://geopard.wordpress.com [↑](#endnote-ref-4)
7. http://code.google.com/intl/sk/apis/maps/index.html [↑](#endnote-ref-5)
8. http://labss2.fiit.stuba.sk/TeamProject/2009/team03is-si/ [↑](#endnote-ref-6)
9. http://labss2.fiit.stuba.sk/TeamProject/2010/team02is-si/ [↑](#endnote-ref-7)